Yielding behavior and traffic conflicts at crossing facilities at channelized right-turn lanes

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OBJECTIVE
Examine yielding behavior and safety issues between cyclists and motorists at crossing facilities at channelized right-turn lanes (CRTLs).

BACKGROUND

CRTLs generally
- Improve traffic flow efficiency
- Avoid ‘unnecessary’ stopping for motorists
- Include pedestrian and cyclist crossings

Limited number of studies:
- Mainly focused on motorized traffic
- Mostly compared right-turn treatments
- Primarily used crash data analyses

Suggested threats to cyclists’ safety:
- Drivers focus on finding a sufficient merging gap
- “Looked-but-failed-to-see” errors
- Drivers blocking the crossing facility
- Drivers’ might not expect cyclists arriving from the right-hand side

FLANDERS (BELGIUM)

Several types of CRTL design:
- Bidirectional cyclist crossing facilities at center of turning lane (most common);
- Semi-automated video analysis software (T-Analyst)

Issues:
- No strict rules or regulations describing use of priority rules for road authorities
- No uniformity in design and consistency in priority rules

METHODOLOGY

- Observation of yielding behavior
- Interactions between cyclists and motorists
- Identification of four crossing behaviors:

<table>
<thead>
<tr>
<th>Priority ruling adhered to?</th>
<th>Offensive</th>
<th>Defensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Taking</td>
<td>Getting</td>
</tr>
<tr>
<td>No</td>
<td>Forcing</td>
<td>Receiving</td>
</tr>
</tbody>
</table>

- Traffic conflict observations
  - TTCmin (< 1.50 seconds)
  - STCT: TA severity level (24 and higher)
  - Semi-automated video analysis software (T-Analyst)

MAIN FINDINGS

Yielding behavior
No influence of priority rule on crossing order
- Cyclists cross first in >80% of the interactions
- Cyclists use a defensive crossing style

Cyclists’ safety
No significant effect of the priority rule found
- However, higher proportions of serious conflicts at locations with motorist priority and cyclists crossing from right to left for both indicators

CONCLUSIONS & DISCUSSION

- Independent of the priority rule at hand, cyclists cross first in most cases
- Consistent with a previous study examining cyclist crossing facilities at roundabouts
- Motorists willingly give away their right-of-way to cyclists (85%)
  - Informal traffic rule, courtesy or fear of inflicting injuries to vulnerable road users?
  - Dangerous in cases where cyclists incorrectly anticipate to receive the right-of-way
- No significant effect of the priority rule on cyclists’ safety was found
  - Higher proportions of serious conflicts for cyclists crossing from right to left at locations with motor priority

RECOMMENDATIONS

Future Research
- Larger datasets
- Crossing behavior definitions
- Other cyclist crossing facility types
- Automated video-analysis software

Policy implications
- Uniformity in design
- Consistency in priority rules